

TITLE:

THE RELATIONSHIP OF MAGNETOTAIL FLOW BURSTS AND GROUND ONSET SIGNATURES

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AUTHORS:

LARRY KEPKO (1), EMMA SPANSWICK(2), VASSILIS ANGELOPOULOS(3), ERIC DONOVAN(2)

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ABSTRACT:

It has been known for decades that auroral substorm onset occurs on (or at least near) the most equatorward auroral arc, which is thought to map to the near geosynchronous region. The lack of auroral signatures poleward of this arc prior to onset has been a major criticism of flow-burst driven models of substorm onset. The combined THEMIS 5 spacecraft in-situ and ground array measurements provide an unprecedented opportunity to examine the causal relationship between midtail plasma flows, aurora, and ground magnetic signatures. I first present an event from 2008 using multi-spectral all sky imager data from Gillam and in-situ data from THEMIS. The multispectral data indicate an equatorward moving auroral form prior to substorm onset. When this form reaches the most equatorward arc, the arc brightens and an auroral substorm begins. The THEMIS data show fast Earthward flows prior to onset as well. I discuss further the association of flow bursts and Pi2 pulsations, in the context of the directly-driven Pi2 model. This model directly links flows and Pi2 pulsations, providing an important constraint on substorm onset theories.